

III. Remarks

A. Amendments to the Claims

Applicants have amended claims 21, 29 and 40 to provide that the unsaturated monomer has a functional group selected from carboxylate, phosphonate, sulfonate and quaternary ammonium. Support for the amendment is provided in the Specification at Paragraph [030].

Applicants have also amended claims 21, 39 and 40 to provide that the polysaccharide is guar. Support for the amendment is provided in the Specification at Paragraph [009]. The Markush groups of forms of guar recited in claims 23 and 24 are supported by the Specification at Paragraph [015].

Applicants have also amended claims 21, 39 and 40 to provide that the guar in the copolymer has a molecular weight of between 100,000 and 700,000 Daltons. Support for these limitations is provided in the Specification in the Abstract and Paragraph [015].

Claims 24–28 have been amended to become dependent upon claim 21 instead of claim 22. Claim 21 provides antecedent support for claims 24–28.

B. Common Ownership of Claimed Subject Matter

In Paragraph 4 of the Action, the Examiner makes the following statement:

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a) the Examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Applicants confirm that the subject matter of the pending claims was commonly owned at the time any inventions covered therein were made.

C. Rejection of Claims under 35 U.S.C. Section 103

The Examiner has maintained the rejection of claims 21–28, 39 and 40 under 35 U.S.C. Section 103(a) as being unpatentable over U.S. Patent No. 3,461,052 to Restaino et al. (already of record) in view of United States Patent No. 5,223,171 to Jost et al. (already of record), or United States Patent No. 4,973,680 to Billmers (already of record).

Applicants' response to the rejection is being made in conjunction with a Declaration of Dr. Leo Zhaoqing Liu (including Tables 1–3), which was previously made of record in Applicants' Amendment and Response to the United States Patent and Trademark Office Examiner's Action which Applicants filed June 3, 2009. The Liu Declaration is being filed concurrently with Applicants' Amendment and Response to the Examiner's Action under 37 C.F.R. Section 1.111 and is marked as EXHIBIT A to it. Dr. Liu is one of the inventors of the invention disclosed and claimed in this application.

1. Examiner's reasons in support of the rejection

For convenient reference, the Examiner's reasons in support of the rejection are set forth below.

Applicants claim a method for grafting an unsaturated monomer onto a polysaccharide comprising the steps of: (1) forming a mixture comprised of an unsaturated monomer and a water soluble or water dispersible polysaccharide; (2) drying the mixture; and (3) irradiating the mixture with an amount of electron beam radiation sufficient to form an unsaturated monomer-water soluble or water dispersible polysaccharide graft copolymer, wherein the graft copolymer is depolymerized to a molecular weight lower than the molecular weight of the ungrafted polysaccharide, and the polysaccharide in the copolymer has a molecular weight of no more than 700,000 [Daltons]. Additional limitations in the claims include specific unsaturated monomers, specific polysaccharides and specific drying steps.

The Restaino et al. patent discloses a process for the production of graft substrates by ionizing radiation, wherein a hydrophilic polymeric substrate is irradiated in the presence of a solution of a monomeric vinyl compound (see abstract). See column 2, 1st paragraph wherein suitable substrates materials are listed, which include cellulose, wool, starch, alginic acid and the alginates, vegetable gums such, for example, as locust bean gum, guar flour or gum tragacanth, gelatin, casein, pectin, polyvinyl alcohol, hydrophilic high molecular weight polyalkylene glycols, and the like, which meet the requirement of the polysaccharides disclosed in instant Claims 22-25. Suitable vinyl monomers are listed in the 2nd paragraph of column 2, which include vinyl acetate, acrylic acid and its esters, methacrylic acid and its esters, acrylamide, acrylonitrile, styrene, vinyl toluene, vinyl pyridine, alkyl vinyl pyridines, divinyl benzene, butadiene, N,N-methylene bis-acrylamide, and the like, which meet the requirements of the unsaturated monomers disclosed in instant Claims 22 and 26-28. The Restaino et al. patent also teaches using radiation to produce graft copolymers wherein the radiation may also be used to depolymerize the polymers. See column 3, 2nd paragraph wherein the Restaino et al. patent teaches that useful graft copolymers of cellulose degradation products may be obtained by employing higher radiation doses.

The method for grafting an unsaturated monomer onto a polysaccharide of the instant claims differs from the process of producing graft copolymers in the Restaino et al. patent by claiming a drying step after forming the mixture, which proceeds to irradiation of a dry mixture.

However, the Billmers patent suggests that irradiation of a dry mixture for grafting is known in the art by disclosing methods for preparing graft polymers which include polymerization in water, in water-solvent mixtures, and in the dry state, which may be initiated by irradiative techniques (see column 9, lines 59-62). The Billmers patent teaches preparation of polysaccharide graft polymers having structure (II) "Sacch-O-((-G)_m(M)_n" (see column 2, line 57), wherein Sacch is a polysaccharide and G is the residue of a polymerizable unsaturated monomer, which embraces the polysaccharide and unsaturated monomer recited in the instant claims.

The method for grafting an unsaturated monomer onto a polysaccharide of the instant claims also differs from the process of producing graft copolymers in the Restaino et al. patent by claiming that the polysaccharide in the copolymer has a molecular weight of no more than 700,000 Daltons.

However, the Jost et al. [patent], which discloses detergent composition containing biodegradable graft polysaccharide shows that graft polysaccharide which consists essentially of a polydextrose having an average-weight molecular mass of less than 10,000 is well known in the art (see abstract). The average-weight molecular mass of less than 10,000 disclosed in the Jost et al. patent falls [within] the requirement of the instant claims that the polysaccharide in the copolymer has a molecular weight of no more than 700,000 Daltons. See column 2, lines 22-25, wherein the Jost et al. patent discloses graft polydextrose being obtained by any known process for grafting ethylenically unsaturated monomers onto polysaccharides and the next sentence which states that the grafting may be effected by irradiation, which is within the scope of the process requirements of instant Claims 21-28, 39 and 40.

One having ordinary skill in the art would have been motivated to combine the teaching of the Restaino et al. patent with the teachings of the Billmers and Jost et al. patent since each of the patents disclose preparation of polysaccharide by grafting [an] unsaturated monomer onto a polysaccharide.

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the grafting conditions [used] to produce graft copolymers via radiation of the Restaino et al. patent with grafting under dry conditions in view of the recognition in the art, as [evidenced] by the Billmers patent, that the preparation of graft polysaccharide in a dry state is an effective procedure for attaching unsaturated monomers onto polysaccharides. It also would have been obvious to produce polysaccharide having a molecular weight of not more than 700,000 Daltons in view of the recognition in the art, as evidenced by the Jost et al. patent, that polysaccharide having an average-weight molecular mass of less than 10,000 allows for the preparation of a product which is biodegradable.

(Examiner's Action, page 3, line 17, to page 5, line 23).

2. **Legal standard for determining whether
Applicants' claims are obvious under 35 U.S.C. Section 103**

The legal interpretation of Section 103 to be applied is set forth in the recent Supreme Court decision of *KSR International Co. v. Teleflex Inc. (KSR)*, 550 U.S. __, 82 USPQ2d 1385 (2007). *KSR* cites *Graham v. John Deere Co. of Kansas City* (383 U.S. 1, 17-18 [148 USPQ 459] (1966)) as setting out an objective analysis for applying Section 103. (82 USPQ2d at 1388). The objective analysis is as follows:

Under § 103, the scope and content of the prior art are to be determined, the differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, *etc.*, might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. As indicia of obviousness or nonobviousness, these inquiries may have relevancy.

(148 USPQ at 467).

Accordingly, the factual inquiries set forth by the Court are as follows:

- [T]he scope and content of the prior art are . . . determined;
- Differences between the prior art and the claims at issue are . . . ascertained;
- The level of ordinary skill in the pertinent art [is] resolved; and
- Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, *etc.*, might be utilized. . . .

3. **Application of
the Graham v. John Deere Co. factual standards**

(a) **Determining the scope and content of the prior art**

Restaino et al. discloses:

A process for the radiation induced grafting of vinyl monomers to hydrophilic polymeric substrates, particularly polyvinyl alcohol. . . . The substrate moistened with water is contacted with a fluid vinyl monomer capable of free radical catalyzed polymerization and irradiated with high energy ionizing radiation to a dosage of 2000 to 10⁸ roentgens. (*emphasis added*)

(Abstract).

The Restaino et al. process comprises contacting the vinyl monomer in fluid, preferably liquid, form with moist substrate irradiated with ionizing radiation. The irradiation of the moist substrate may be effected prior to its contact with the fluid monomer or while it is in contact therewith." (Column 2, lines 23-28).

In the Restaino et al. process, "[t]he degree of moistening can vary over a wide range. Although Restaino et al. discloses that moistening, *i.e.*, adding as little as 10% by weight of water on the hydrophilic substrate markedly increases the rate of grafting" (Column 2, lines 31-34), Restaino et al. recommends adding higher concentrations of water to the substrate. Restaino et al. further discloses:

A preferred procedure, then, is to moisten the hydrophilic substrate with from about 30% to about 100% of the amount of water it will imbibe without formation of a supernatant phase, immerse the moistened substance in the chosen vinyl monomer or monomers, or in a solution thereof in an inert solvent, subject the suspension to gamma-ray irradiation, remove it from the radiation field and separate the formed graft copolymer from an reacted and homopolymerized monomer.

(Column 2, lines 54-62).

In the Examples of Restaino et al. material to be irradiated is soaked or otherwise contacted with excess water then contacted with a monomer and irradiated.

In all of the Examples according to the invention, the material to be irradiated is moist and the product weighed more than the treated material, demonstrating that the product was a graft copolymer [having a higher molecular weight than the starting polysaccharide]. The comparative Examples in which the material to be irradiated is dry prior to irradiation resulted in no or virtually no weight gain. See column 4, lines 22–25, column 5, lines 44–48, and column 6, lines 20–22 and 71–72. The absence of a weight gain indicates that the irradiation step produces no cross-linking, *i.e.*, product not a graft copolymer.

Accordingly, the Restaino et al. process must include the step of moistening and preferably soaking a wet polysaccharide monomer prior or during irradiation and teaches away from irradiation of a dry monomer. The process produces a graft copolymer having a weight greater than the monomer.

In support of the rejection, the Examiner relies on Restaino et al. as disclosing a process for the production of graft substrates by ionizing radiation, wherein a hydrophilic polymeric substrate is irradiated in the presence of a solution of a monomeric vinyl compound.” The Restaino et al. patent is also relied on as teaching “using radiation to produce graft copolymers wherein the radiation may also be used to depolymerize the polymers.” (Examiner’s Action, page 3, lines 27–29 and page 4, lines 8–10). The Examiner particularly relies on the passage at column 3, lines 11–13, which is part of the following passage at column 3, lines 4–13:

Higher radiation doses, up to and even exceeding 10^8 roentgens may be employed. Obviously, if the substrate undergoes depolymerization or degradation under the effect of radiation and it is desired to retain the polymeric structure of the substrate the dose must be correspondingly limited. Thus, when grafting onto cellulose, excessive degradation is avoided by keeping the radiation dose below about 10^6 roentgens. Useful graft copolymers of cellulose degradation products may, however, be obtained by employing higher radiation doses. (*emphasis added*)

Restaino et al. contains no description of such useful graft copolymers of cellulose degradation products or of an example of a process in which this suggestion is actually carried out.

The Examiner relies on Billmers as disclosing a drying step after forming the mixture step (1) of the claimed process and prior to process step (3). For support, the Examiner refers to column 9, lines 59–62 of Billmers, which reads as follows:

Methods for preparing graft polymers include polymerization in water, in water-solvent mixtures, and in the dry state and may be initiated by mechanical, chemical and irradiative techniques.

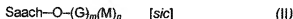
The Examiner also relies on the Billmers patent as teaching "preparation of polysaccharide graft polymers having structure (11) "Sacch—O-(G)_m(M)_n" (See column 2, line 57), wherein Sacch is a polysaccharide and G is the residue of a polymerizable unsaturated monomer, which embraces the polysaccharide and unsaturated monomer recited in the instant claims." (Examiner's Action, page 4, lines 20–24).

The Billmers invention:

... relates to polysaccharide derivatives and polysaccharide graft polymers which contain organosiloxane substituents. These compositions are prepared by reacting a polysaccharide with a difunctional reagent which contains a siloxane group and a group which will react with a polysaccharide. ***The polysaccharide-reactive group of the reagent forms an ether or ester linkage with the polysaccharide, thereby attaching a reactive siloxane group to the polysaccharide.*** (emphasis added).

The polysaccharide graft polymers having structure (11) identified in the Examiner's Action also include a siloxane group as an essential ingredient. The disclosure in Billmers relating to structure (11) is set forth at column 2, line 55, to column 3, line 17, which reads as follows:

Also provided is a polysaccharide graft polymer, having the structure:



wherein Saach—is a polysaccharide; m is zero or one; G is the residue of a polymerizable, unsaturated monomer which is bonded to the polysaccharide by an ether or ester linkage; n is greater than one; and M is the residue of one or more polymerizable, unsaturated, monomer(s), at least one of which is a siloxane-containing monomer, which have been grafted to the polysaccharide by free radical polymerization. M may take the form:



wherein Z is the residue of a polymerizable, unsaturated organic group which is bonded to the silicon by a carbon-silicon linkage; R₁ is a C₁–C₆ alkyl or alkenyl group, or an aryl, aralkyl or alkaryl group; and R₂ and R₃ are, independently, C₁–C₆ alkyl or [alkenyl] groups, or aryl, aralkyl or alkaryl groups, or alkoxides of C₁–C₆ alkyl or alkenyl groups, or aryl, aralkyl or alkaryl groups, or alkoxides wherein R₂ and R₃ together form a cyclic structure of at least five members. The alkyl and alkenyl chains may be straight or branched.

The Examiner relies on Jost et al. for the disclosure of a "graft polysaccharide which consists essentially of a polydextrose having an average-weight molecular mass of less than 10,000 . . . (see abstract)." Jost et al. is cited in order to satisfy "the requirement of the instant claims that the polysaccharide in the copolymer has a molecular weight of no more than 700,000 Daltons." (Examiner's Action, page 4, line 39, to page 5, line 5).

Jost et al. is directed to:

A detergent composition containing, as a "builder," a graft polysaccharide which consists essentially of a polydextrose having an average-weight molecular mass of less than 10,000 and onto which a water-soluble ethylenically unsaturated monomer is grafted.

(Abstract).

The Examiner's Action further characterizes Jost et al. as disclosing a detergent composition comprising the referenced graft polysaccharides (Examiner's Action page 4, lines 29–30). The Examiner's Action also characterizes Jost et al. as disclosing graft polydextrose being obtained by any known process for grafting ethylenically unsaturated monomers onto polysaccharides and that the grafting may be effected by irradiation. (Examiner's Action, page 5, lines 5–8).

The grafted product is a combination of the polydextrose and the ethylenically unsaturated monomer. (Column 2, lines 22–25). Accordingly, the product has a higher molecular weight than the monomers forming the product.

**(b) **Ascertaining the differences
between the prior art and the claims at issue****

In the "Response to Arguments" section in Paragraph 6 of the Action, the Examiner makes the following statement regarding Applicants' arguments as to the Restaino et al. patent:

Applicants argue against the rejection of the claims on the ground that the Restaino et al. patent does not disclose Applicants' claimed method step of depolymerization of the graft copolymer, let alone depolymerization of the graft copolymer to a molecular weight lower than the molecular weight of the ungrafted polysaccharide. This argument is not persuasive since the Restaino et al. patent discloses useful graft copolymers of cellulose degradation products may be obtained by employing high radiation doses (see column 3, lines 11–13). Applicants argue that the instantly claimed process has a drying step which is the opposite of the moistening step in the process described in the Restaino et al. patent. This argument is not persuasive since the Restaino et al. patent discloses the substrate thereof as having as little as 10% by weight of water during the grafting process. It

is noted that the amount of moisture present during the grafting procedure has not been recited in the instantly claimed method.

(Examiner's Action, page 5, line 25, to page 6, line 8).

As described in the Abstract, Restaino et al. discloses a process for the radiation induced grafting of vinyl monomers to hydrophilic polymeric substrates. Restaino et al. discloses that the hydrophilic starting polymer should be moistened with water before irradiation. (Column 2, lines 13-62). This disclosure is followed in all of the Examples according to the invention.

Restaino et al. further discloses repeatedly that "dry" hydrophilic starting polymers treated in the same manner as the moist starting polymers had no gain in weight, or virtually no gain in weight, indicating that no grafting occurred. (See column 4, lines 22-25, column 5, lines 44-48 and column 6, lines 20-22 and lines 71-72).

As noted above, the Examiner relies on column 3, lines 11-13 of Restaino et al. for a teaching of using radiation to produce graft polymers wherein the radiation may also be used to destabilize the polymers (Examiner's Action, page 4, lines 20-22).

This passage in Restaino et al. discloses that when grafting onto cellulose, excessive degradation to the cellulose is avoided by controlling the radiation dose. By employing higher radiation doses, useful graft polymers of cellulose degradation products may be obtained. Hence, at higher radiation doses, the cellulose is degraded and then grafted.

Applicants' claimed method relates to guar and not cellulose. Accordingly, Restaino et al. does not disclose Applicants' claimed method step of depolymerization of guar in the graft polymer.

Applicants' method as claimed in claims 21-28, 39 and 40 comprises the step of drying the mixture of unsaturated monomer and polysaccharide before irradiation. Accordingly, Applicants' claimed method has a drying step which the Examiner has acknowledged is not disclosed in Restaino et al. Restaino et al. requires a step of moistening the substrate. Restaino et al. also discloses that the use of dry material before irradiation is to be avoided because the irradiated dry material does not undergo grafting. In contrast, Applicants' process as exemplified employs powder which is further dried — unlike the Restaino et al. process, which employs moist substrate.

In the "Response to Arguments" section in Paragraph 6 of the Action, the Examiner makes the following statement regarding Applicants' arguments as to the Billmers patent:

Applicants further argue that the mere mention in the Billmers patent of polymerization in the dry step provides no motivation to one of ordinary skill in the art to replace the polymerization method disclosed in, and essential to, the practice of the Restaino et al. invention. This argument is not persuasive since one having ordinary skill in the art would have been motivated to combine the teaching of the Restaino et al. patent with the teachings of the Billmers and Jost et al. patents since each of the patents disclose[s] preparation of polysaccharide by grafting an unsaturated monomer onto a polysaccharide. Furthermore, the Billmers patent does suggest that irradiation of [the] dry mixture for grafting which may be initiated by irradiative techniques is known in the art (see column 9, lines 59–62).

(Examiner's Action, page 6, lines 18–27).

Billmers is directed to the formation of a polysaccharide grafted onto a siloxane-containing monomer. As noted above, structure (11) cited in the Examiner's Action must also comprise a siloxane. Applicants' claimed method is directed to the formation of a guar grafted onto a monomer selected from the group other than siloxanes, namely carbonate, sulfate, phosphate and quaternary ammonium.

As noted above, Billmers discloses three methods of graft polymerization. They are: (i) polymerization in water; (ii) in water-solvent mixtures; and (iii) in the dry state. Billmers also discloses that polymerization may be initiated by mechanical, chemical and irradiation techniques. Hence, the disclosure in Billmers of graft polymerization in either the wet or dry state would not lead one of ordinary skill in the art to Applicants' drying step because Restaino et al. teaches that moistening of the substrate prior to or during irradiation is an essential precondition to polymerization of the substrate. The common teaching of Billmers and Restaino et al. is polymerization of the substrate in the wet state.

The combination of the Restaino et al. and Billmers methods does not teach Applicants' claimed drying step to one of ordinary skill in the art because that combination would incapacitate the process disclosed in Restaino et al.

Billmers does not disclose Applicants' claimed method steps of drying the mixture and depolymerizing the graft copolymer to a molecular weight lower than the molecular weight of the ungrafted polysaccharide. As the Examiner observes, Restaino et al. discloses a polysaccharide graft polymer in which a polymerizable unsaturated monomer is grafted onto the polysaccharide to form a graft copolymer having a molecular weight higher than the molecular weight of the ungrafted polysaccharide. See Examiner's Action, page 5, lines 2-6.

In the "Response to Arguments" section in Paragraph 6 of the Action, the Examiner makes the following statement regarding Applicants' arguments as to the Jost et al. patent:

Applicants also argue that the Jost et al. patent does not disclose Applicants' claimed method step (3) of irradiating the mixture with an amount of electron beam radiation sufficient to form an unsaturated monomer-water soluble or water dispersible graft copolymer, wherein the graft copolymer is depolymerized to a molecular weight lower than the molecular weight of the ungrafted polysaccharide. The Jost et al. patent is generally cited to show that preparation of grafted polysaccharides having a molecular weight of no more [than] 700,000 as instantly claimed obtained by a process that involve[s] grafting ethylenically unsaturated monomers onto polysaccharides which may be effected by irradiation is known in the art.

(Examiner's Action, page 6, lines 9-17).

As acknowledged in the Examiner's Action, Jost et al. is directed to a graft polysaccharide which consists essentially of a polydextrose having an average-weight molecular mass of less than 10,000 [Daltons]. Applicants' claimed graft copolymer comprises as the polysaccharide, guar and not polydextrose. In Applicants' claimed process the irradiated guar has a molecular weight range of between 100,000 to 700,000 Daltons, which is substantially above the molecular weight of the polydextrose disclosed in Jost et al.

Jost et al. discloses grafting a polysaccharide onto a water-soluble ethylenically unsaturated monomer. Jost et al. does not disclose Applicants' claimed method step (3) of irradiating the mixture with an amount of electron beam radiation sufficient to form an unsaturated monomer-water soluble or water dispersible graft copolymer, wherein the graft copolymer is depolymerized to a molecular weight lower than the molecular weight of the ungrafted polysaccharide. In addition, Jost

et al. does not disclose that the starting material undergoes the step of drying the mixture prior to the irradiation step.

The Jost et al. disclosure has no relevance to Applicants' claimed method because it is directed to the production of dextrose at a molecular weight well outside Applicants' claimed molecular weight range.

In Applicants' claimed method, the drying step produces significant advantages, contrary to the disclosure in Restaino et al.

As described in his Declaration, Dr. Liu conducted a series of tests to determine more precisely the effect of the drying step on the method disclosed and claimed in his application. These tests included a drying step in which the initial mixture, produced according to step 1 of the claimed method, was dried to moisture contents of between about 0.74% and 30.2% according to step 2 of the claimed method. The dried mixtures were treated according to step 3 of the claimed process and were measured in terms of the percentage conversion of the mixture to the graft copolymer at different concentrations of electron beam radiation. The data obtained in these tests are set forth in Tables 1-3, which include a three-dimensional graph of the data for each of Tables 1-3. The graphs show for each test the moisture content, the dose of electron beam radiation, and the rate of conversion of the mixture into a polysaccharide graft copolymer. (Liu Declaration, Paragraph 12).

On the basis of the results submitted in Tables 1-3, Dr. Liu determined that for lower doses of electron beam radiation, the optimum range for drying the mixture is to a moisture content of 5-20%. Drying the mixture to 30% moisture content at which the dried mixture felt dry still improved the efficiency of the claimed method. The drying step resulted in a higher rate of conversion of the mixture into a polysaccharide graft copolymer. The absence of a drying step also had the disadvantage that a greater amount of electron beam radiation was needed to accomplish the formation of the polysaccharide graft copolymer to the same degree. In addition, the product resulting from the drying step has the advantage that it is generally easier to handle than the product without the drying step. (Liu Declaration, Paragraph 13).

Drying the mixture to a moisture content below 5% will still improve the efficiency of the claimed method. It should be noted that excessive drying, *i.e.*, so that the material contained no moisture, was neither necessary nor desirable as the completely dry mixture could pose a hazard if further subjected to electron beam radiation. (Liu Declaration, Paragraph 14).

As noted above, Restaino et al. discloses that the mixture to be irradiated must be moist, *i.e.*, cannot feel dry. Jost et al. does not disclose drying the mixture before irradiation. Aside from the mere mention of a dry state, Billmers exemplifies a starting material that is wet or a liquid.

(c) **Resolving level of ordinary skill in the pertinent art**

The inventors of the present application and the inventors of the prior art patents would represent persons of ordinary skill in the art.

(d) **Utilizing, if possible, such secondary considerations as commercial success, long felt but unsolved needs, failure of others**

There has been a need for a method of modifying water-dispersible and/or soluble cellulose derivatives with vinyl monomers with the intention of producing new products that can be used, preferably in liquid compositions by preparation of graft guar having a controlled molecular weight that is lower than the original guar.

4. **Applicants' claimed method is nonobvious over the Restaino et al., Jost et al. and Billmers patents**

Accordingly, for the reasons set forth above, the rejection of claims 21-28 under 35 U.S.C. Section 103(a) as being unpatentable over United States Patent No. 3,461,052 to Restaino et al., in view of United States Patent No. 5,223,171 to Jost et al. or United States Patent No. 4,973,680 to Billmers, is untenable and should be withdrawn.

IV. Conclusion

Applicants believe that the foregoing Amendments and Remarks constitute a complete response under 37 C.F.R. Section 1.111 and that all bases of rejection in the Examiner's Action have been adequately rebutted or overcome. A Notice of Allowance in the next Office is, therefore, respectfully requested. The Examiner is requested to telephone the undersigned attorney if any matter that can be expected to be resolved in a telephone interview is believed to impede the allowance of pending claims 21-28 and 39-40 of United States Patent Application No. 10/607,079.

Respectfully submitted,

PAUL AND PAUL

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